an approach would be an abdication of the Commission's responsibility under Section 254(c)(3).

Section 254(c)(3) is the sole source of the Commission's authority to supplement the Section 254(c)(1) definition of universal service. Section 254(c)(3) states that:

> In addition to the *services* included in the definition of universal service under [Section 254(c)(1)], the Commission may designate additional services for such support mechanisms for schools, libraries, and health care providers for the purposes of subsection (h). (emphasis added)

There can be no doubt that the above-italicized reference to "services" refers to "telecommunications services" because the Section 254(c)(1) definition of "universal service" is expressly so limited. By using the above-underlined phrase "additional services," Section 254(c)(3) clearly means "additional telecommunications services," consistent with the use of "services" throughout Section 254(c). Any doubt of that interpretation is removed by Section 254(h)(1)(B), which discusses reimbursement for telecommunications carriers providing "any of its services which are within the definition of universal service under [Section 254(c)(3)]." Nowhere do these operative Sections address information services such as Internet access, or the services, hardware, or software associated with installing internal connections, or funding non-carriers.

Section 254(h)(2)(A), upon which the Joint Board relies for its overexpansive definition, speaks of competitively neutral rules "to enhance . . . access to advanced telecommunications and information services." (emphasis added) It does not speak of discounts, funds for discount reimbursement or carrier contributions; it speaks only of "competitively-neutral rules." Earlier in the Recommended Decision, the Joint Board properly recognized the distinction between supporting a telecommunications service, and supporting "access to" a telecommunications service. See Recommended Decision, paras. 51, 65, 67. Section 254(h)(2)(A) embodies a similar concept. The Commission is to adopt competitively neutral rules "to enhance . . . access," not to include and support information services or non-telecommunications service provided by non-

carriers.

What the Joint Board has essentially recommended is a re-write of the Act to merge the discount and funding concept of Section 254(h)(1)(B) with the "enhance . . . access to" language of Section 254(h)(2)(A). This the Commission cannot adopt. These provisions are two distinct sections, each discussing a separate manner in which to promote the Act's goals. Had Congress intended such action to occur, it simply would have created one section discussing how discounts and fund reimbursements should be used to support advanced telecommunications and information services. Congress did not do so, and neither the Joint Board nor the Commission has the authority to re-write the statute. Funding under Section 254(c)(3) is instead expressly limited to telecommunications carriers only, and then for the provision of "its [telecommunications] services that are within the definition of universal service under" Section 254(c)(3).

With its attempt to meld the two subsections, the Joint Board sweeps "internal connections" into its expansive interpretation. To do so, the Joint Board bootstraps from one proposition to another. First focusing on the word "service" of Section 254(c)(3) in the absence of its context, the Joint Board finds that the "installation and maintenance" of internal connections are just such "services" and that the distinction between facilities and those "services" is not practical. In essence, the Joint Board concluded that any "good" can be a Section 254(c)(3) "service" if only structured "properly." Based on that interpretation and though not expressly stated, the Joint Board must have concluded that transmission facilities (e.g., copper wire, fiber, coaxial cable), "routers, hubs, network file servers, and wireless LANs" are all Section 254(c)(3) "services" that should be included within its definition of universal service.[35]

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[35] For some unarticulated reason, the Joint Board specifically does not include personal computers as a "service" even though the only difference between a personal computer, on the one hand, and a router, hub, or network file server, on the other, may be the software used.

SBC respectfully disagrees with the interpretation of the Joint Board. Leasing facilities or CPE does not turn them into services, as FCC Commissioner Chong recognizes,[36] and especially not a Section 254(c)(3) telecommunications service. Under the Joint Board's approach, the Commission would have unlimited authority to fund any service or any leased equipment, including personal computers, software, and teacher training. Indeed, the Commission would conceivably be able to require funding of buildings and classrooms under Section 254 if they were used as a means to provide a location where access to advanced telecommunications and information services were provided.

Nor can the Joint Board treat the "technically feasible and economically reasonable" limitations so as to expand the reach of Section 254(h)(1)(B). Recommended Decision, para. 477. Merely because something may be argued to be technically feasible and economically reasonable does not make it eligible for universal service funding, especially where competitive neutrality is violated in that non-carriers can receive support but are not required to contribute to the fund. Congress had no intention of extending the Commission's authority beyond telecommunications services offered by carriers.

If Sections 254(c)(3) and 254(h) are so interpreted to support funding for non-carriers and non-telecommunications services, contributions made to fund discounts for schools and libraries will constitute taxes, the imposition of which would be unconstitutional. No longer could the contributions made by carriers conceivably be seen as "assessments" or "fees" to ensure the availability of "just, reasonable, and affordable" telecommunications services.[37] Instead, interstate carriers would be required to contribute to a fund that would be used to pay non-carriers (e.g.,

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[36] "Separate Statement of FCC Commissioner Rachelle B. Chong, Concurring in Part, Dissenting in Part," pp. 6-10.

[37] See Rural Telephone Coalition v. FCC, 838 F.2d 1307 (D.C.Cir. 1988).

information service providers, wiring and BDS/LAN contractors, computer vendors) to achieve educational goals unrelated to the regulation of telecommunications.[38] In other words, interstate carriers will be required to fund, up to the recommended tune of $2.25 billion annually, a new entitlement program for schools and libraries to upgrade their facilities. As a tax, Article I, Section 7 of the United States Constitution requires that "[a]ll Bills for raising Revenues [must] originate in the House of Representatives." Section 254 originated in the Senate.[39] Accordingly, funding any non-telecommunications service or non-carrier would make the contributions required from interstate carriers an unconstitutional tax.

Furthermore, to the extent that Section 254 is interpreted so as to impose a tax, those provisions of Section 254 that address education providers, libraries, and health care providers are unconstitutional delegations of authority. In delegating legislative authority, Congress must provide "an administrative agency with standards guiding its actions such that a court could 'ascertain whether the will of Congress has been obeyed.'" Skinner v. Mid-America Pipeline, 490 U.S. 212, 218 (1989). With Sections 254(c)(3) and 254(h), the only Sections addressing education providers, libraries, and health care providers, Congress has supplied no such standard

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[38] See South Carolina v. Block, 717 F.2d 874, 887 (4th Cir. 1983) (the distinction between a "fee" and a "tax" is whether "regulation is the primary purpose" of the statute; tax involves raising revenue for "general welfare"), cert. denied, 465 U.S. 1080 (1984). Under the applicable standards, Section 254(h) may be wholly suspect as an unconstitutional tax even if limited to carriers in that additional funding is required for schools, libraries, and health care providers even though telecommunications services are available at "just and reasonable" rates. Notwithstanding meeting that regulatory standard, additional funding is being required to fund discounts that are intended to achieve general welfare goals (support for rural health care, education, libraries).

[39] S. B. 652, from which Section 254 was taken in large part, including the taxing provisions , was introduced in the Senate on March 30, 1995, and passed the Senate, as amended, on July 15, 1995. H. R. 1555 was not introduced until May 3, 1995, and passed the House on August 4, 1995.

for determining what telecommunications services should be included within the Section 254(c)(3) definition of universal services. Section 254(c)(3) references only Section 254(h). Section 254(h)(1) only refers back to Section 254(c)(3), and sets a standard for the discount, but not what telecommunications services should be included. Section 254(h)(2) provides insufficient guidance, only broadly requiring that the Commission establish rules which "enhance, to the extent technically feasible and economically reasonable, access to advanced telecommunications and information services . . for all" eligible beneficiaries. Unlike previous cases where the delegation to tax was deemed sufficient, these taxes have not been imposed to recoup agency costs, are not limited in amount, and inure to the benefit of entities outside of the Commission's jurisdiction.[40] Congress will have created a new entitlement without providing sufficient guidance on what the entitlement should be to, or the amount in which the new entitlement should be funded. In fact, as interpreted by the Joint Board, there is no limit on what can be funded, or the amount of funds that can be collected save what the Commission may impose at its discretion. Without additional guidance as to the goal or objective of the entitlement or the exercise of the taxing authority, especially as interpreted by the Joint Board, Sections 254(c)(3) and Section 254(h) would be constitutionally invalid.

The Commission thus should interpret Sections 254(c)(3) and 254(h) "narrowly to avoid constitutional problems." National Cable Television Assn. v. United States, 415 U.S. 336, 342 (1974). In its interpretation, the Joint Board reads the term "services" and "such services" so as to refer to services generally (in contrast to "goods") and then characterizes items such as wires, computers, services, and software as "services." Under that approach, anything that meets the vague "enhance . . . access to advanced telecommunications services and information services" is

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[40] See, e.g., Skinner v. Mid-America Pipeline, supra; FPC v. New England Power Co., 415 U.S. 345 (1974).

eligible for a discount, funding, and tax support from carriers under Section 254. For this and other reasons set forth in further detail herein, Sections 254(c)(3) and (h) should be read as limited to telecommunications services only.

Beyond these problems with the Recommended Decision, the administrative difficulties of managing such a recommendation will add significant costs and problems to the process. By extending the ability to receive funding beyond telecommunications carriers, the Joint Board's recommendation significantly increases the number of service providers that the universal service fund administrator must deal with, thereby increasing administrative burdens and costs. Moreover, extending reimbursement to non-carriers, many of which are not subject to any current regulatory scrutiny, opens this process to potential problems of abuse and fraud. Notably and unreasonably, the Joint Board did not extend its certification, recordkeeping, auditing, and rate appeal recommendations to such non-carriers. See, e.g., Recommended Decision, para. 546, 596.

Finally, the Joint Board also recommends that discounts should apply to all telecommunications without any regard whatsoever of the principle established in Section 254(b)(6) (which speaks to access to "advanced telecommunications services") or Section 254(h)(2) (which only mentions "advanced telecommunications services" and "information services"). In marked contrast with the approach taken for defining universal service under Section 254(b)(1), the Joint Board made no determinations on which specific services or functions should be included within the Section 254(c)(3) definition of universal service. Instead, by mere virtue of a service being a "telecommunications service," the Joint Board has "determined" that it falls within Section 254(c)(3) and should be eligible for support regardless of how the telecommunications service may actually be used. The Joint Board thus places, for funding purposes, call waiting used for administrative purposes on the same level as high-speed video transmission services used for distance learning. Combined with the recommended aggregate

limit on annual discount funding, the support would be misdirected as some schools will get, for example, discounted toll service to raise money for band uniforms while others may be told that funds do not exist for distance learning to gain access to classes that are otherwise unaffordable. Given both the language of the Act and the legislative history liberally quoted by the Joint Board, there can be no doubt that Congress did not intend that Section 254(c)(3) be used in such a haphazard manner. Adopting this recommendation of the Joint Board would violate the Act, and would be arbitrary, unreasonable, and otherwise unlawful.

d. The Consortia Recommended by the Joint Board Should Be Accountable for Proper Accounting and Use of the Discounted Services

The Joint Board recommends the formation of consortia consisting of eligible and non-eligible institutions. While SBC questions the Commission's authority to allow such consortia, SBC understands the public policy rationale for the recommendation. However, if the Commission decides to allow such consortia, then the members of the consortia should be liable for proper accounting and use of the discounted services. The Joint Board's recommendation that service providers maintain the financial records necessary to account for proper use of the discounted services is misplaced and inappropriate.

XI. THE COMMISSION MUST RECOGNIZE THAT THE THREE FACETS OF THE "COMPETITION TRILOGY" ARE INTERTWINED AND ANY DISTURBANCE IN THE EXISTING BALANCE WILL NECESSARILY IMPACT THE STABILITY OF THE LEC INDUSTRY

From regulatory and other legal constraints on their retail and wholesale pricing due to multiple federal and State obligations (e.g., Section 251(c), COLR/RTS obligations), incumbent LECs are no less pervasively regulated today than ever, and may even be more regulated. The constitutional requirements of Hope and Dusquesne thus still apply with unabated and undiluted force, entitling incumbent LECs to a reasonable opportunity to recover their prudently incurred

expenses and to earn a reasonable return on their prudent investments used in fulfilling their regulatory obligations.

The Commission should be careful that its "Competition Trilogy" does not ignore the Commission's responsibility to meet the constitutional standard. With the Interconnection Order, the Commission adopted a forward-looking costing methodology.[41] Even though stayed, the Commission has continued to champion that methodology and to push for forward-looking costing under Section 252(d). With the Recommended Decision, the Joint Board has also recommended the use of a forward-looking cost methodology. Interpolating from those two actions, there is likely to be an expectation that the Commission will reform access pricing by using forward-looking cost principles.

Nowhere within that structure is there a recognition that incumbent LECs' costs are "real," and recovery must be allowed. See NARUC v. FCC, 737 F.2d 1095 (D.C.Cir. 1984), cert. denied, 469 U.S. 1227 (1985). The Act is based, in part, on the premise that the universal service proceeding would provide sufficient support to recover those real costs. Unless the Commission modifies the Recommended Decision, that premise will have been violated. As the Commission deliberates on this matter, it must be aware of the impacts its actions are certain to have on the constitutional rights of incumbent LECs just as it recognizes the need to effect an environment suitable for true competitive entry. The Commission must be careful to construct a universal service plan that is indeed competitively neutral and that does not result in the confiscation of incumbent LEC property.

In that regard, the Commission should expressly recognize that the federal fund to support those services comprising "universal service" does not preclude a State from adopting an

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[41] For this reason, among others, the Interconnection Order is currently on appeal as noted earlier. See n. 4 supra.

intrastate fund to provide support for the same services. States should retain the flexibility to adopt universal service support plans that do permit incumbent LECs to "maintain [their] financial integrity, to attract capital, and to compensate [their] investors for the risk [they have] assumed." Dusquesne, 488 U.S. at 310.

XII. CONCLUSION

In considering the Recommended Decision, the Commission should remain focused on the goals, principles, restrictions, and limitations established by Section 254 and the Act as a whole, and should adopt universal service rules accordingly. SBC has demonstrated that various recommendations would not conform to Section 254 or the Act, and provided various alternatives that would.

Respectfully submitted,

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December 19, 1996

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EX PARTE OR LATE FILED

Attachment A

October 29, 1996

EX PARTE

Mr. James D. Schlichting
Chief, Competitive Pricing Division
Common Carrier Bureau
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

RECEIVED
OCT 29 1996
FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Re: Federal-State Joint Board on Universal Service, CC Docket No. 96-45; Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, CC Docket No. 96-98

Dear Mr. Schlichting:

Pursuant to your recent request, Southwestern Bell Telephone Company (SWBT) hereby provides information and analyses concerning the Hatfield Model (version 2, release 2), which has been submitted to the Commission in the above-reference rule making dockets. The analyses demonstrate in detail significant shortcomings of the Hatfield Model. Specifically, SWBT provides an analysis of structure assignment costs in the Hatfield Model and a sensitivity analysis of the Model for SWBT in Missouri.

Pursuant to Section 1.1206(a)(1) of the Commission's rules, 47 C.F.R. § 1.1206(a)(1), two copies of this letter and the analyses have been provided to the acting secretary of the Commission.

Should you have any questions concerning the foregoing, do not hesitate to contact me.

Sincerely,

Todd F. Silbergeld

Attachments

cc: Mr. William F. Caton, Acting Secretary

SWBT ANALYSIS OF STRUCTURE ASSIGNMENT COSTS IN HATFIELD MODEL

The Hatfield Model allocates only 33% of the cost of poles , conduit and buried cable trenching cost to the telephone operations. The remaining 67% would theoretically be paid for by other utilities. This is based on the assertion in the Hatfield documentation that "plant structure (conduit, poles, and trenches) will be shared by several service providers. The structure assignment parameters in the Expense Module allow the user to vary the amount of structure investment for aerial, underground, and buried feeder and distribution facilities assigned to telephone users. The default value is 0.33 for all categories".[1] This calculation takes place in the Expense Module on the "Distribution" and "Feeder" worksheets. The "Structure fraction assigned to telephone" factors are found in cells F59 - H60 on the "Inputs" worksheet. They are shown separately for distribution and feeder.

Changing these factors from .33 to 1 increases the average loop cost per month for Southwestern Bell as shown below:

	Average Cost Per Loop		
	FCC Submission	With Correction	% Increase
Arkansas	$16.12	$19.98	24%
Kansas	$14.96	$19.38	30%
Missouri	$13.36	$17.30	29%
Oklahoma	$15.70	$20.10	28%
Texas	$11.87	$15.86	34%

The approach taken in the Hatfield model is unrealistic and not representative of most telephone companies operations. The poles, conduit and buried cable trenching are normally done by each company in a area. There are a number of reasons why the hypothetical arrangement under the Hatfield model would be impractical.

1. It is impractical to place power cable and telecommunications cable in close proximity to one another because of electrical field created by the power cable . This could cause "hum" on the telecommunications facilities for voice communication and make these facilities unusable for data transmission, such as PC\Internet use.

2. Even in the placement of facilities to new developments, the coordination necessary to 'share' the cost of placement among utilities/CATV is not readily accomplished because of the timing and availability of

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[1] Model Description, Hatfield Model, Version 2.2, Release 2, dated September 4, 1996, Page 36

construction crews to meet individual time frames, let alone combined time frames. Typically power facilities are placed as soon as lot lines, road/sidewalk easements are known. Telephone cable would be placed as the homes near completion and the cable TV would be placed after homes are occupied. Having the facilities in their own 'structures' also allows each "utility" to perform maintenance/repair of their own facility without undue risk of potential disruption of other utilities service as a result of damage to a common structure.

The more traditional way to deal with the shared use of facilities is through rental agreements, such as pole attachment arrangements and conduit rentals. In these arrangements, each company would install its own facilities and structure or they would place their facility in/on structures owned by another utility. The utility using another companies structure would pay the structure owner rent commensurate with the structure used. These arrangements are common for poles, less common for conduit and impractical for trenching.

Attached is a Sensitivity Analysis of the Hatfield Model for Southwestern Bell Telephone in Missouri. In addition to the specific structure allocation change, a number of other changes were made in the inputs to the Hatfield Model to be more consistent with SWBT Forward Looking Economic Cost Studies. The results show that with these changes the cost per loop increases by $14.83 from $13.26[2] to $28.09. Over half of the total increase, or $7.54, is associated with the correction of the structure allocation[3].

The other changes are explained in the attached analysis.

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[2] This amount ($13.26)is reflective of the information presented in interconnection arbitration proceedings in Missouri that are based on the Hatfield Model. The only difference from that information provided to the FCC is that the depreciation lives have been changed on the Missouri arbitration runs to reflect the last FCC depreciation represcription. SWBT has changed these lives in the Sensitivity Analysis to be more consistent with forward looking methodology.

[3] This change assigned 40% of poles, 100% of conduit and 100% of buried cable trenching to telephone.

Hatfield Model Sensitivity Analysis
Unbundled Loop Cost
Southwestern Bell Telephone Company - Missouri

Purpose of the Sensitivity Analysis

The monthly costs for unbundled loops calculated by the Hatfield model and Southwestern Bell Telephone (SWBT) cost studies are significantly different - $13.26 versus $22.75.[1] Differences in cost estimates are caused by two factors:

- *Differences in the structure of cost models.* These may include,
  - *Differences in costing methods* (e.g., computing plant costs per unit of maximum useable capacity versus per unit of expected, average utilization).
  - *Differences in cost elements* (e.g., including main distributing frame costs with end office switching costs versus loop costs).
  - *Differences in the type of source data* used for costing (e.g., pole and conduit resource costs versus factors which express pole and conduit investment relative to cable investment).
- *Differences in input (source data) to the cost models* (e.g., construction cost data, mix of plant types, plant fill factors and others.)

Sensitivity analyses typically are used to evaluate the effect of changes in input to a cost model on the model result. For example, the most important input values to a cost model can be identified by varying input values to the model, one at a time, and determining which input values cause the greatest change in the result.

Sensitivity analyses also can be used to isolate the effect of differences in input between two cost models. In this case, the input from one model is used in the other, preferably one at a time, to determine the effect of input value differences on model results.

If the two models produce the same or similar results, having modified all input to be the same, then it is reasonable to conclude any differences in the structure of the models are immaterial. If the models continue to produce significantly different results, differences in

[1] The unbundled loop monthly costs include loadings for "common costs." The Hatfield model cost includes a loading of 10% of direct costs for "variable overheads." The SWBT cost includes a loading of 16.47% of direct costs for prospective joint and common costs. One of the sensitivity analyses determines the change in the Hatfield model cost from substituting SWBT's 16.47% loading for Hatfield's 10% loading.

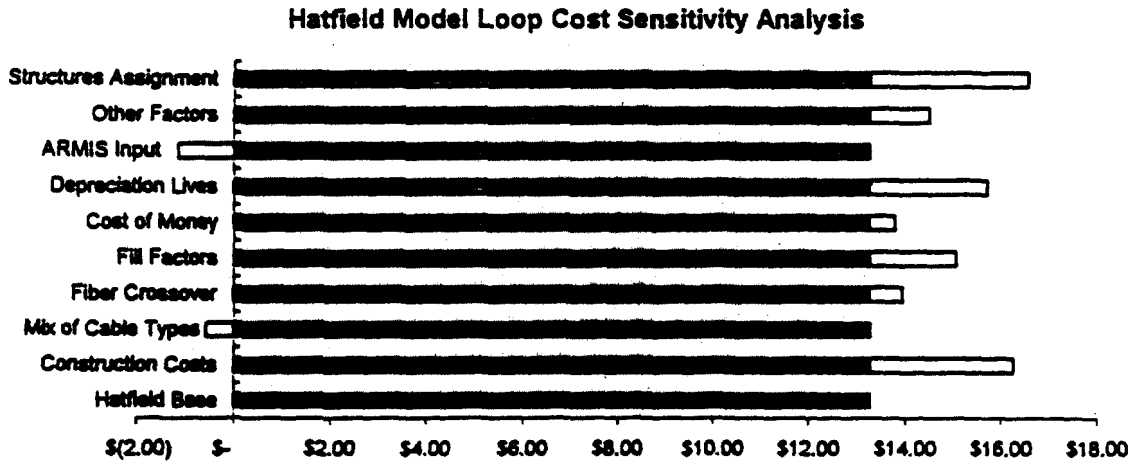
model structure are significant. Changes in the structure of one model would have to be made to identify the effect of structural differences on model results. Structural changes, though, may not be practical depending on the size and complexity of the cost models.

The sensitivity analyses of the Hatfield model have three purposes: First, to determine (to the extent possible) the effect on loop costs of using SWBT input data in the Hatfield model. Secondly, to identify the most important differences in input values. Third, to conclude whether significant structural differences in the Hatfield and SWBT models remain which cause differences in cost estimates.

Results of Sensitivity Analyses

Nine sensitivity analyses were run on the Hatfield model. The results are illustrated below in Figure 1. Exhibit 1 summarizes the results of the individual sensitivity analyses and the effect of changing the inputs on a cumulative basis. Exhibit 2 provides some detail of the effects of the various changes on the components of the unbundled loop (Loop Distribution, Loop Concentration, and Loop Feeder by major categories of cost). Exhibit 3 shows where the changes in input values were made for the sensitivity analysis by the shaded areas on the 'User Input' worksheet and the 'ARMIS Expense' worksheet.

Figure 1



Hatfield Base

The bottom bar in Figure 1 represents the result of the Hatfield model before any changes to model input. The monthly loop cost is $13.26. Each bar above the Hatfield Base represents the results of one of the nine sensitivity analyses.

Construction Costs

A key input to the calculation of monthly loop costs is the cost of material, equipment, labor, etc. used to construct loop facilities. The four most important categories of construction cost input for loops are *cable costs per foot, buried cable placement labor costs, pole and conduit cost data*, and *digital loop carrier cost data*.

SWBT and Hatfield input values for the first two - cable costs per foot and buried cable placement costs - are similar and were not changed in the sensitivity analysis. Pole and conduit cost data and digital loop carrier cost data are significantly different between the models. SWBT cost data for these categories were substituted for Hatfield model data. Other construction cost data, such as serving area interface (SAI) also were changed.

The result of this sensitivity analysis was to increase the Hatfield model monthly loop cost from $13.26 to $16.26. This is primarily due to SWBT's corrected digital loop carrier construction cost data.

Mix of Cable Types

In this sensitivity analysis, the proportions of prospective aerial, buried and underground cable plant were changed in the Hatfield model to those used by SWBT. For distribution cable, there was a reduction in the use of aerial cable and increases in buried and underground cable. For feeder cable, aerial cable also was decreased. The effect was to slightly decrease the monthly loop cost.

Fiber Crossover Distance

The length of fiber cable where fiber plant (and digital loop carrier) is used rather than copper plant was changed from 9,000 feet to 15,000 feet used by SWBT. All other input being the same, this raises the monthly loop cost by $0.68. However, when both SWBT's higher digital loop carrier equipment costs and mix of cable types are used, the effect of extending the crossover distance to 15,000 feet is to lower monthly loop costs by $0.27. (See Figure 2.)

Fill Factors

Hatfield fill factors for distribution cable and digital loop carrier systems were modified to yield the same effective utilization levels as used in the SWBT study. Although feeder cable fill factors can be modified in the Hatfield model, it was not possible to compute the effective utilization for feeder cable in the Hatfield model.

Consequently, it was not possible to adjust feeder cable fill to match the SWBT value. Lowering fill factors for distribution cable and digital loop carrier systems to SWBT levels raises the Hatfield monthly loop cost by $1.79 or 13%.

Cost of Money

Hatfield model values for debt ratio, cost of debt and the cost of money were changed to those used by SWBT. Since SWBT's cost of money figure for Missouri regulatory purposes is slightly higher than the Hatfield model (10.69% versus 10.01%), the effect was to raise monthly loop costs by $0.56 from $13.26 to $13.79, or 4%. For the Model to be used in the interstate jurisdiction, further adjustments would be necessary to reflect the FCC authorized cost of money as identified below:

	HATFIELD	FCC
Debt Percent	42%	44.2%
Cost of Debt	7.7%	8.8%
Cost of Equity	11.9%	13.2%

Depreciation Lives

The Hatfield model uses plant service lives for cable and wire facilities and circuit equipment which are longer than those expected by SWBT. In addition, the Hatfield model does not recognize net salvage values for cable and wire facilities. To adjust the Hatfield model input, the depreciation lives were all recomputed to produce the same depreciation rate as the economic lives with net salvages expected by SWBT. These lives then were substituted for those in the Hatfield model. The result of this correction was to increase monthly loop costs by $2.45 or 18%.

ARMIS Input[2]

Two adjustments were made to the ARMIS investment and expense input to the Hatfield model. First, ***embedded*** investments were restated on a higher, ***current*** cost basis. Since network expenses are computed based on the ratio of expenses to investment, this had the effect of lowering network expense factors and the resulting network expenses. The second adjustment was to eliminate the effect of the compensable property adjustment, which in many cases increased Missouri's ARMIS reported expenses. This is necessary because that while the expense,

[2] ARMIS Inputs (and other loading factors) were adjusted to reflect the differences in the development of Annual Cost Factors.

return amd tax amounts are charged to the benefitting stat, the investment remains on the host state's reports. Thus, any ratio (i.e. network expense factors) developed with an investment in the denominator must eliminate the compensable property adjustment from the numerator.[3] The net result of these two adjustments was to lower the Hatfield monthly loop cost from $13.26 to $12.10.

Other Factor

Several other loading factors were adjusted to levels comparable to those used by SWBT. One of the most important changes was to increase the "variable overhead" factor from 10% to 16.47%. This increases the level of common costs allocated to the monthly loop cost. The effect of all other factor changes was to increase the loop cost by $1.25.

Structures Assigned to Telephone

Input to the Hatfield model was changed to reflect that no conduit or buried cable placement costs are attributed to other utilities. The portion of aerial cable attributed to other utilities was reduced from 67% to 60% to reflect the amount of poles used in SWBT's study. These changes result in a substantial increase in monthly loop costs - from $13.26 to $16.57.

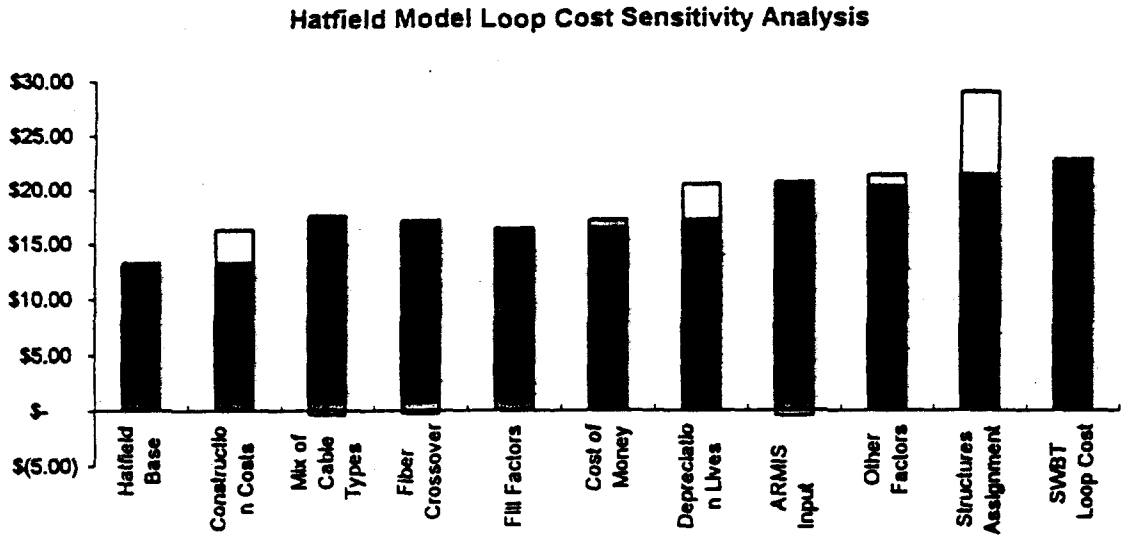
Cumulative Effects of Changes in Model Input

Figure 2 shows the effect on the Hatfield monthly loop costs of accumulating the effects of each of the nine changes described above. In some cases, such as the fiber crossover distance, there is some interaction between this change and other changes. The cumulative sensitivity analysis captures these effects. The effect of making all nine changes to the Hatfield model would be to raise the monthly cost from $13.26 to $28.09.

It should be understood that the effect of two or more individual changes can not be determined from the sum of the individual effects. This is due to the many interactions of the variables and the calculations within the model. If changes other than those included in this analysis are to be made they should be input into the model and run to determine the effect.

[3] Missouri expense amounts on the ARMIS reports are net of transfers to other states for expenses and capital costs on plant in Missouri used to provide services to other states. Since capital cost transfers are charged to expense accounts, the effect is to lower the expense amounts below the level of actual expenses to repair and maintain associated plant. In some cases, expense account balances actually are negative. The Hatfield study does not recognize this.

Figure 2



Differences in the Structure of the Cost Models

Since the cumulative result of the sensitivity analyses ($28.09) is substantially different from SWBT's monthly cost estimate $22.75 (including joint and common costs), this indicates there are significant structural differences in the models.[4] Some of these include the way in which distribution cable distances are calculated, the method for computing poles and conduit investment, the exclusion of the main distributing frame from loop costs in the Hatfield model, and the way in which premises termination investment is calculated.

Conclusions

Based on the nine sensitivity analyses, the most significant input value differences between the SWBT and Hatfield models *for loop costs* appear to be in the areas of construction costs, especially digital loop carrier costs, the fiber crossover distance, depreciation lives, and the assignment of structures investment to other utilities. Beyond these differences in input, there are significant differences in model structure which contribute to differences in loop costs.

[4] $22.75 = $19.53 loop cost X (1 + 16.47% joint and common cost allocation).

HATFIELD MODEL SENSITIVITY ANALYSIS
UNBUNDLED LOOP COST
MISSOURI

CHANGE	User Input Worksheet Line Numbers	Individual Changes		Cumulative Change *		
		Loop Cost	Difference	Loop Cost	Incremental Difference	Cumulative Difference
Base Hatfield Run		$13.26	$0.00	$13.26	$0.00	$0.00
1. Construction Cost Related	55 77 - 168, 196 - 216, 245 - 272, 300 - 332, 345 - 375, 377 - 384, 386 - 389, 395 - 435, 439 - 455, 462 - 567	$16.26	$3.00	$16.26	$3.00	$3.00
2. Mix of Cable Types	173 - 194, 221 - 242, 277 - 298, 456 - 458	$12.70	($0.56)	$15.87	($0.39)	$2.61
3. Fiber crossover distance	391	$13.94	$0.68	$15.60	($0.27)	$2.34
4. Fill Factors	60 - 73, 376, 385	$15.05	$1.79	$15.89	$0.29	$2.63
5. Corrected Cost of Capital	32 - 36	$13.79	$0.53	$16.64	$0.75	$3.38
6. Corrected Depreciation Lives	17 - 29	$15.71	$2.45	$19.95	$3.31	$6.69
7. Adjustments to ARMIS Input	'ARMIS Expense' worksheet changes	$12.10	($1.16)	$19.50	($0.45)	$6.24
8. Loading Factor Corrections	41 - 44, 47, 48, 51, 52	$14.51	$1.25	$20.55	$1.05	$7.29
9. % Structure Assigned to Telephone Correction	335 - 342, 438	$16.57	$3.31	$28.09	$7.54	$14.83

NOTES: * THE CUMULATIVE CHANGE CAN NOT BE DETERMINED BY SUMMING THE AMOUNT OF CHANGE ASSOCIATED WITH INDIVIDUAL CHANGES DUE TO THE INTERACTIONS OF THE CHANGED VARIABLES.

Exhibit 1

Hatfield Model Sensitivity Analysis
Unbundled Loop Costs
Missouri

Total Lines	2,808,994									
	Hatfield Base	Construction Costs	Mix of Cable Types	Fiber Crossover Distance	Fill Factors	Cost of Money	Depreciation Lives	Adjusted ARMIS Input	Other Factors	Structures Assigned Telephone
Loop Distribution (Including MDI)										
Investment	$ 879,780,672	$ 882,719,998	$ 959,174,128	$ 879,780,672	$ 1,030,807,014	$ 879,780,672	$ 879,780,672	$ 879,780,672	$ 879,780,672	$ 1,207,326,260
Capital Costs	$ 124,281,226	$ 124,696,446	$ 135,496,653	$ 124,281,226	$ 145,615,792	$ 132,707,330	$ 152,584,441	$ 124,281,226	$ 122,734,754	$ 170,551,667
Network Expenses	$ 75,153,506	$ 77,597,024	$ 48,621,044	$ 75,581,367	$ 95,175,021	$ 75,153,506	$ 75,153,506	$ 55,297,482	$ 75,153,506	$ 78,528,565
Support Expenses	$ 57,192,639	$ 45,475,411	$ 56,304,516	$ 55,747,509	$ 65,821,419	$ 58,386,765	$ 59,740,098	$ 48,804,636	$ 63,242,042	$ 61,847,121
Variable Overheads	$ 25,662,738	$ 24,776,886	$ 24,042,221	$ 25,561,011	$ 30,661,223	$ 26,624,760	$ 28,748,805	$ 22,838,334	$ 43,008,161	$ 31,092,755
Total Annual Costs	$ 282,290,109	$ 272,545,769	$ 264,464,434	$ 281,171,113	$ 337,273,455	$ 292,872,361	$ 316,236,850	$ 251,221,870	$ 304,138,463	$ 342,020,308
Monthly Cost / Loop	$ 8.37	$ 8.09	$ 7.85	$ 8.34	$ 10.01	$ 8.69	$ 9.38	$ 7.45	$ 9.02	$ 10.15
Loop Concentration										
Investment	$ 267,390,327	$ 710,436,569	$ 267,390,327	$ 104,346,722	$ 294,487,027	$ 267,390,327	$ 267,390,327	$ 267,390,327	$ 267,390,327	$ 267,390,327
Capital Costs	$ 46,763,457	$ 124,247,440	$ 46,763,457	$ 18,249,028	$ 51,502,355	$ 48,905,370	$ 67,950,669	$ 46,763,457	$ 46,350,879	$ 46,763,457
Network Expenses	$ 4,109,299	$ 10,926,533	$ 4,109,299	$ 1,626,702	$ 4,527,109	$ 4,109,299	$ 4,109,299	$ 4,124,692	$ 8,402,068	$ 4,109,299
Support Expenses	$ 16,254,441	$ 32,325,125	$ 16,721,524	$ 5,593,752	$ 16,846,731	$ 16,530,166	$ 20,811,925	$ 14,400,889	$ 19,680,602	$ 13,278,889
Variable Overheads	$ 6,712,720	$ 16,749,910	$ 6,759,426	$ 2,546,948	$ 7,287,619	$ 6,954,466	$ 9,287,189	$ 6,528,924	$ 12,259,205	$ 6,415,184
Total Annual Costs	$ 73,839,917	$ 184,249,008	$ 74,353,708	$ 28,016,430	$ 80,163,814	$ 76,499,343	$ 102,159,082	$ 71,818,162	$ 86,692,754	$ 70,566,809
Monthly Cost / Loop	$ 2.19	$ 5.47	$ 2.21	$ 0.83	$ 2.38	$ 2.27	$ 3.03	$ 2.13	$ 2.57	$ 2.09
Loop Feeder										
Investment	$ 359,668,904	$ 391,049,840	$ 395,659,074	$ 610,399,417	$ 359,668,904	$ 359,668,904	$ 359,668,904	$ 359,668,904	$ 359,668,904	$ 648,115,258
Capital Costs	$ 50,822,029	$ 55,256,226	$ 55,907,521	$ 86,250,817	$ 50,822,029	$ 54,288,317	$ 66,384,787	$ 50,822,029	$ 50,183,696	$ 91,580,150
Network Expenses	$ 11,317,158	$ 11,370,539	$ 5,090,467	$ 24,459,821	$ 11,447,828	$ 11,317,158	$ 11,317,158	$ 8,973,414	$ 11,317,158	$ 12,922,245
Support Expenses	$ 20,586,146	$ 16,364,948	$ 20,249,779	$ 35,299,892	$ 19,406,192	$ 21,236,304	$ 23,387,671	$ 17,234,627	$ 22,927,898	$ 28,250,193
Variable Overheads	$ 8,272,533	$ 8,299,171	$ 8,124,777	$ 14,601,053	$ 8,167,605	$ 8,684,178	$ 10,108,981	$ 7,703,007	$ 13,905,415	$ 13,275,259
Total Annual Costs	$ 90,997,865	$ 91,280,884	$ 89,372,544	$ 160,611,583	$ 89,843,654	$ 95,525,957	$ 111,198,577	$ 84,733,077	$ 98,334,165	$ 146,027,847
Monthly Cost / Loop	$ 2.70	$ 2.71	$ 2.65	$ 4.76	$ 2.67	$ 2.83	$ 3.30	$ 2.51	$ 2.92	$ 4.33
Total Loop										
Investment		$ 1,984,206,397	$ 1,622,223,529	$ 1,594,526,811	$ 1,684,962,945	$ 1,506,839,903	$ 1,506,839,903	$ 1,506,839,903	$ 1,506,839,903	$ 2,122,833,845
Total Annual Costs	$ 447,127,891	$ 548,085,661	$ 428,190,686	$ 469,799,126	$ 507,280,923	$ 464,897,661	$ 529,594,509	$ 407,772,917	$ 489,165,382	$ 558,614,964
Monthly Cost / Loop	$ 13.26	$ 16.26	$ 12.70	$ 13.94	$ 15.05	$ 13.79	$ 15.71	$ 12.10	$ 14.51	$ 16.57

Exhibit 2

	B	C	D	E
8	**State**		*Missouri*	
9	Company 1		*RBOC*	
10	Company 2			
11	Company 3			
12				Variable
13	Input Name	Default	Inputs	Name
14				
15	**Cost of Capital Factors**			
16	***Depreciation Lives***			
17	Loop Distribution	20		DistLife
18	Loop Feeder	20		FeedLife
19	Loop Concentrator	10		ConcLife
20	Wire Center	37		WireLife
21	End Office Switching	14.3		EOLife
22	Tandem Switching	14.3		TandLife
23	Transport Facilities	19		TransLife
24	Operator Systems	8		OpLife
25	STP	14		STPLife
26	SCP	14		SCPLife
27	Links	19		LinkLife
28	Public Telephones	9		PubLife
29	General Support	7		GenLife
30				
31	***Cost of Capital***			
32	Debt Percent	45.00%		DebtP
33	Cost of Debt	7.70%		DebtCost
34	Cost of Equity	11.90%		EquityCost
35	*Equity Percent*	*55.00%*		
36	*Overall Cost of Capital*	*10.01%*		
37				
38				
39	**Misc Expense Factors**			
40				
41	Variable Overhead Factor	10.00%		VarOvhd
42	Federal Income Tax Rate	40.00%		FITRate
43	Other Taxes Factor	5.00%		OtherTax
44	Operating State and Local Income Tax Fa	1.00%		StateIT
45	Billing/Bill Inquiry per line per month	$1.22	$1.22	Billing
46	Directory Listing per line per month	$0.15	$0.15	Directory
47	Forward-Looking Network Operations Fac	70.00%		NetOps
48	Central Office Switching Expense Factor	2.69%		COSwitch
49	End Office Traffic-Sensitive Fraction	70.00%	70.00%	EOTraffic
50	per-line Monthly LNP Cost	$0.25	$0.25	LNP
51	alternative CO switching factor	0.0269		ACOSF
52	alternative circuit equipment factor	0.0153		ACEF
53	Carrier-carrier customer service per line p	$1.56	$1.56	CarCar
54	NID expense per line per year	$3.00	$3.00	NIDExp
55	Swithc line circuit offset per DLC line	$35.00		CircOffs
56				
57	**Fill Factors**			

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
58	Cable			
59	*Feeder*			
60	0-5	0.65	0.65	Feeder0
61	5-200	0.75	0.75	Feeder5
62	200-650	0.80	0.80	Feeder200
63	650-850	0.80	0.80	Feeder650
64	850-2550	0.80	0.80	Feeder850
65	2550+	0.80	0.80	Feeder2550
66				
67	*Distribution*			
68	0-5	0.50		Dist0
69	5-200	0.55		Dist5
70	200-650	0.60		Dist200
71	650-850	0.65		Dist650
72	850-2550	0.70		Dist850
73	2550+	0.75		Dist2550
74				
75	**EO Switching Parameters**			
76				
77	Busy hour call attempts, residential	1.3	1.3	BHCAR
78	Busy hour call attempts, business	3.5	3.5	BHCAB
79	Switch Maximum Line Size	100,000	100,000	MaxLines
80	Switch Maximum Line Fill	0.8	0.8	MaxLineFill
81	Switch Maximum Processor Occupancy	0.9		MaxProc
82	Processor Feature Loading Multiplier	1	1	FeatureMult
83	Switch Installation Multiplier	1.1		InstallMult
84				
85	*Switch Parameters*			
86	Switch real-time limit, BHCA			
87	1 - 1,000	10,000	10,000	BHCA1
88	1,000 - 10,000	50,000	50,000	BHCA2
89	10,000 - 40,000	200,000	200,000	BHCA3
90	40,000+	600,000	600,000	BHCA4
91				
92	Switch traffic limit, BHCCS			
93	1 - 1,000	10,000	10,000	BHCCS1
94	1,000 - 10,000	50,000	50,000	BHCCS2
95	10,000 - 40,000	500,000	500,000	BHCCS3
96	40,000+	1,000,000	1,000,000	BHCCS4
97				
98	*Switch cost points*	lines		
99	Low line size	2,782		LowSize
100	Mid line size	11,200		MidSize
101	High line size	80,000		HighSize
102		cost/line		
103	Low line size	$220.00		LowCost
104	Mid line size	$86.00		MidCost
105	High line size	$59.00		HighCost
106				

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
107	Residential Holding Time Multiplier	1.00	1.00	resHT
108	Business Holding Time Multiplier	1.00	1.00	busHT
109	Busy Hour fraction of daily usage	0.10	0.10	BHF
110	Annual to daily usage reduction factor	270.00		UsRed
111				
112	**Interoffice and Tandem Parameters**			
113				
114	Operator Traffic Fraction	0.02		OpFrac
115	Total Interoffice Traffic Fraction	0.65		InterFrac
116	Direct-Routed Fraction of Local Interoffice	0.98		DirectFrac
117	Maximum Trunk Occupancy, CCS	27.5		TrunkCCS
118	Trunk Termination Investment, per end	$100		TermInv
119	Average Direct Route Distance, miles	10		Miles
120	Average Trunk Usage Fraction	0.3	0.3	TrunkFrac
121				
122	*Toll traffic inputs*			
123	Tandem-routed % of total intraLATA traffic	0.2		tandLATA
124	Average direct intraLATA route distance, m	25		LATAdist
125	Tandem-routed % of total interLATA traffic	0.2		tandAccess
126	Average direct access route distance, mi.	15		Accessdist
127				
128				
129	*Tandem Switching parameters*			
130	real time limit, BHCA	1,500,000	1,500,000	tandBHCA
131	port limit, trunks	120,000		portlimit
132	common equipment investment	$1,000,000		tandcominv
133	maximum trunk fill	0.8	0.8	maxtrunkfill
134	maximum real time occupancy	0.9		tandmaxocc
135	common equipment intercept factor	0.25		tandintercept
136				
137	**Wire Center Parameters**			
138				
139	Lot size, multiplier of switch room size	2	2	LotSize
140	Tandem/EO wire center common factor	0.4	0.4	WCcomm
141				
142	*Power and frame investment*	sum of power & frame		
143	0	$10,000		PF1
144	1,000	$20,000		PF2
145	5,000	$40,000		PF3
146	25,000	$100,000		PF4
147	50,000	$500,000		PF5
148				
149	*Switch Room size table*	floor area required		
150	0	500	500	Room1
151	1,000	1,000	1,000	Room2
152	5,000	2,000	2,000	Room3
153	25,000	5,000	5,000	Room4
154	50,000	10,000	10,000	Room5
155				

User Inputs

	B	C	D	E
13	Input Name	Default	Inputs	Name
14				
156	*Construction costs, per sq ft*	construction/$/sq ft		
157	0	$75		Const1
158	1,000	$85		Const2
159	5,000	$100		Const3
160	25,000	$125		Const4
161	50,000	$150		Const5
162				
163	*Land price, per sq ft*	price/sq ft		
164	0	$5.00	$5.00	Land1
165	1,000	$7.50	$7.50	Land2
166	5,000	$10.00	$10.00	Land3
167	25,000	$15.00	$15.00	Land4
168	50,000	$20.00	$20.00	Land5
169				
170	**Distribution Structure Inputs**			
171				
172	*Aerial Fraction*			
173	0-5	0.5		distaerial1
174	5-200	0.5		distaerial2
175	200-650	0.5		distaerial3
176	650-850	0.5		distaerial4
177	850-2550	0.4		distaerial5
178	2550+	0.65		distaerial6
179				
180	*Buried Fraction*			
181	0-5	0.5		distbur1
182	5-200	0.5		distbur2
183	200-650	0.5		distbur3
184	650-850	0.5		distbur4
185	850-2550	0.5		distbur5
186	2550+	0.05		distbur6
187				
188	*Underground Fraction*			
189	*0-5*	*0*		*distug1*
190	*5-200*	*0*		*distug2*
191	*200-650*	*0*		*distug3*
192	*650-850*	*0*		*distug4*
193	*850-2550*	*0.1*		*distug5*
194	*2550+*	*0.3*		*distug6*
195				
196	*Buried Installation/foot*			
197	0-5	$2.00	$2.00	distburinv1
198	5-200	$2.00	$2.00	distburinv2
199	200-650	$2.00	$2.00	distburinv3
200	650-850	$3.00	$3.00	distburinv4
201	850-2550	$3.00	$3.00	distburinv5
202	2550+	$20.00	$20.00	distburinv6
203				
204	*Conduit Installation/foot*			